PATENT
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IN THE U.S. PATENT AND TRADEMARK OFFICE

In re application of

Adrianus Johannes Wilhemus VAN DER LEEST et al. Conf. 9461

Application No. 10/581,079 Group 3683

Filed May 31, 2006 Examiner Thomas Irvin

Title: CONTINUOUSLY VARIABLE TRANSMISSION

DECLARATION UNDER RULE 132

Assistant Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Arjen Brandsma, hereby declare as follows:

I am a Technical University graduate in mechanical engineering and I am active in field of continuously variable transmission (CVT) design since March 1993 until the present day. I am a (co-)inventor in over 30 patent applications in the field of CVT.

I am a co-inventor of U.S. Application NO. 10/276,855, published as US 2003/0144097 ("BRANDSMA").

I am also a co-inventor of U.S. Application NO. 10/581,079 ("VAN DER LEEST") that is the subject of the present application procedure.

BRANDSMA Figures 4B, 5B and 6B each show the pulley discs in a loaded state, whereby the resulting deformation and resulting convex shape of the contact surfaces of the discs has been highly exaggerated and schematized to be able to illustrate such deformation and shape.

In reality the actual deformation and resulting slightly convex shape of the discs (Figs. 4B and 5B) -at least when departing form the conventionally applied straight shape thereof (Figs. 4A and 5A)- will cause the contact angle to increase by less than 1 degree, typically only by several tenths of a degree. To realize the effect of VAN DER LEEST, however, the adaptation of the contact angle provided thereby will be considerably over 1 degree in the order of several degrees.

BRANDSMA Figures 4A, 5A, 6A each show the pulley discs in the unloaded state, i.e., as manufactured. The contact surfaces of the pulley discs are either straight (Figures 4A and 5A) or concavely curved (Figure 6A). BRANDSMA does not provide pulley discs that are convexly curved in the said unloaded state.

In my experience, the CVT configurations disclosed in BRANDSMA, e.g., Figures 4A, 4B, 5A, 5B, 6A, and 6B, at least as applied in and during operation of a practical CVT design, the clamping force ratio (KpKs) varies between less than 1 in the

largest transmission ratio "Low" up to more than 1.8 in the smallest transmission ratio "Overdrive".

The configurations disclosed in BRANDSMA, e.g., Figures 4A, 4B, 5A, 5B, 6A, and 6B do not provide a contact angle (λ) that is adapted in relation to a radial position (Rp, Rs) where, in the largest transmission ratio "Low", the clamping force ratio (KpKs) has a value in the range between 1 and the clamping force ratio (KpKs) in the smallest transmission ratio "Overdrive".

The configurations disclosed in BRANDSMA, e.g., Figures 4A, 4B, 5A, 5B, 6A, and 6B do not provide a contact angle (λ) that is adapted in relation to a radial position (Rp, Rs) where, in the smallest transmission ratio "Overdrive", the clamping force ratio (KpKs) has a value in the range between 1.8 and the clamping force ratio (KpKs) in the largest transmission ratio "Low".

The configurations disclosed in BRANDSMA, e.g., Figures 4A, 4B, 5A, 5B, 6A, and 6B do neither explicitly, nor necessarily or implicitly provide that a highest value for the contact angle (λ) for the pulley disks in relation to the radial position (Rp, Rs) is higher for the pulley disks (21, 22) of the primary pulley (2) than the corresponding value for the contact angle (λ) for the pulley disks (31, 32) of the secondary pulley (3).

The configurations disclosed in BRANDSMA, e.g., Figures 4A, 4B, 5A, 5B, 6A, and 6B do not provide that the contact angle (λ) in relation to the radial position (Rp, Rs) corresponds for the two pulley disks (21, 22; 31, 32) of a respective pulley (2, 3), and, at least in the smallest transmission ratio (Rs/Rp) of the transmission (1), a ratio between the contact angle (λ) for the primary pulley (λp) and the contact angle (λ) for the secondary pulley (λs) satisfies the condition that:

$$1 < \frac{\tan(\lambda p)}{\tan(\lambda s)} \leq 1.6$$

The configurations disclosed in BRANDSMA, e.g., Figures 4A, 4B, 5A, 5B, 6A, and 6B do not provide that, at least in the largest transmission ratio (Rs/Rp) of the transmission (1), the ratio between the contact angles (λp, λs) satisfies the condition that:

$$0.6 < \frac{\tan(\lambda p)}{\tan(\lambda s)} \leq 1$$

The configurations disclosed in BRANDSMA, e.g., Figures 4A, 4B, 5A, 5B, 6A, and 6B do neither explicitly, nor necessarily or implicitly provide that for both the primary pulley (2) and the secondary pulley (3) the lowest value for the contact angle (λ) is

approximately 7 degrees.

The configurations disclosed in BRANDSMA, e.g., Figures 4A, 4B, 5A, 5B, 6A, and 6B do neither explicitly, nor necessarily or implicitly provide i) that for both the primary pulley (2) and the secondary pulley (3) the lowest value for the contact angle (λ) is approximately 7 degrees, and ii) that for the primary pulley (2) the highest value for the contact angle (λ) is approximately 10 degrees, and in for the secondary pulley (3) the highest value for the contact angle (λ) is approximately 9 degrees.

The configurations disclosed in BRANDSMA, e.g., Figures 4A, 4B, 5A, 5B, 6A, and 6B do not provide that when the transmission (1) is operating, a coefficient of friction between the primary pulley (2) and the drive belt (10) in relation to a radial position (Rp) of a contact point between therebetween has a lowest value at the location of a radially outermost position of the contact point. Rather, in my experience, the coefficient of friction between the primary pulley and the drive belt in the BRANDSMA CVT configurations may be considered to have an essentially constant value in relation to the said radial position (Rp).

The configurations disclosed in BRANDSMA, e.g., Figures 4A, 4B, 5A, 5B, 6A, and 6B do not provide that the coefficient of

friction between the primary pulley (2) and the drive belt (10) is lower than a coefficient of friction between the secondary pulley (2) and the drive belt (10) at the location of a radially outermost position of a contact point between therebetween. Rather, in my experience, the said coefficients of friction have essentially the same value in the BRANDSMA CVT configurations.

The configurations disclosed in BRANDSMA, e.g., Figures 4A, 4B, 5A, 5B, 6A, and 6B do not provide that the contact angle (λ) for the two pulley disks (21, 22; 31, 32) of a respective pulley (2, 3) has a value which corresponds, and in that for both the primary pulley (λp) and the secondary pulley (λs) the respective contact angle (λ) in relation to the transmission ratio (Rs/Rp) of the transmission (1) at least substantially corresponds to the contour shown for in the present application (VAN DER LEEST) Figure 12.

The configurations disclosed in BRANDSMA, e.g., Figures 4A, 4B, 5A, 5B, 6A, and 6B do not provide that the clamping force ratio (KpKs) in relation to the transmission ratio (Rs/Rp) of the transmission (1) has an approximately constant value. Rather, in my experience, the clamping force ratio varies in relation to the transmission ratio in the BRANDSMA CVT configurations, in particular between less than 1 in the largest transmission ratio

"Low" up to more than 1.8 in the smallest transmission ratio "Overdrive".

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Arjen BRANDSMA,

Date 13-11-2008

Tilburg, The Netherlands